Two New Species of Deepwater Bivalves from the Caribbean Sea

BY

H. E. VOKES

Department of Geology, Tulane University, New Orleans, Louisiana 70118

(Plate 53; 2 Text figures)

Among the several interesting species of bivalve mollusca secured by the U. S. Fish and Wildlife M/V *Oregon II* during a recent program of fisheries investigations in the Caribbean Sea were a pair of fresh valves of *Solemya (Acharax)* and a complete specimen, with animal, plus a worn right valve of a large species of *Lima (Acesta)*. Both proved to be undescribed species, and both represent the second species of their respective subgenera to be recorded from the waters of the western Atlantic Ocean. All were secured in one shrimp net trawl from *Oregon II* station 10288, at latitude 11°27′ N, longitude 73°42′ W, about 20 miles off the coast of Colombia, South America, at a depth of 220 fathoms. Judging from small amounts of adhering matrix, the bottom sediment was composed of greenish-grey mud.

The writer is greatly indebted to Mr. Harvey R. Bullis, Base Director of the Pascagoula, Mississippi Station of the Fish and Wildlife Service for permission to study and describe these specimens.

Solemyidae Gray, 1840

Solemya Lamarck, 1818

Type species, by SD (Children, 1823) "*Solenomya*" [=*Solemya*] *Mediterranea* Lamarck = *Tellina togata* Poli, 1791 + *solen* (Von Salis, 1793). Recent, Mediterranean and Adriatic Seas.

For synonymy and a discussion of the problem of fixing the type species of *Solemya*, see Vokes, 1955, which also includes a list of known Tertiary and Recent species.

(Acharax) Dall, 1908

Type species, by OD, *Solemya johnsoni* Dall, 1891. Recent, Eastern Pacific.

The subgenus *Acharax* Dall includes those large, usually deep water species of *Solemya* with a wholly external, opisthodetic ligament.

Solemya (Acharax) caribbaea H. E. Vokes, spec. nov.

(Plate 53, Figures 1, 2; Text figure 1)

The shell is heavy for the genus, large, elongate, strongly inequilateral, widely gaping anteriorly, with the anterior end much longer than the posterior and with broad, low and inconspicuous umbones located slightly behind the posterior third of the total length. It is covered by a strong, blackish-brown periostracum that is produced beyond the margins of the shell, especially anteriorly and ventrally, and is continuous dorsally over the gap between the two valves which do not contact each other except in the area immediately between the umbos. This periostracum is translucent and of a dark amber tint in the portions that project beyond the shell; in the posterior and posteroventral areas it is produced into ragged finger-like processes that are prolongations of that portion of the structure covering the wide inter-rib areas of the valve surface, with the re-entrants between the processes making the areas where the periostracum lies over the broad primary ribs on the valve. In the median areas of the valve, where the rib and interspace ornamentation is not strongly developed, the periostracal projection is not divided. The anterior dorsal margin of the valve is long, slightly convex, almost straight, sharply rounded into the anterior end, the upper half of which is straight, the ventral half broadly and regularly rounded into the very slightly concave ventral margin which, posteriorly, curves gently into the arcuate posterior margin. The posterior dorsal margin is marked by a low narrow ridge that rises vertically above the adjacent outer valve surface, straight in the area behind the nymph plate, slightly arcuate laterally around

that plate to leave a groove for the reception of the ligament, then curving upward to terminate immediately behind the umbo. The dorsal margin is the thickest area of the valve, there being a buttress-like thickening under the anterior half of the nymph plate that extends forward and under the low umbone to fill the sub-umbonal cavity; anterior to this the margin is thickened externally to form a low, round-topped, rib-like structure that extends to the most anterior extremity of the margin. The surface of the valve below this dorsal ridge is ornamented by low broad radial ribs separated by relatively wider interspaces. Three such ribs extend to the anterior end of the valve, while a fourth marks the antero-ventral junction. The tops of these ribs are relatively flat in the younger stages of growth, but in the later stages one or more (usually one) very shallow and broad grooves tend to develop on the rib surface; these are not as sharp nor as well marked as are the interspaces between the ribs. These interspaces are set off from the ribs by relatively narrow and deep round-bottomed channels with the area between the channels slightly convex upward, suggesting low rounded secondary ribs and these, in turn, bear on their upper surface narrow grooves, usually 2 or 3 in number, that serve to delimit narrow, rounded, tertiary rib-like structures. Posterior to the fourth primary rib the median surface of the valve shows a tendency to have broad ribs and interspaces, but there is no marked distinction in the relative height of these structures though the rounded margining grooves persist as do, to a lesser extent, the shallower, less well marked ridges on the central parts of the rib and interspace area. The postero-ventral margin is marked by 3 relatively wide and flat-topped radial ribs separated from each other by 2 broad interspaces that are approximately of the same width as the adjacent ribs, and like the interspaces on the anterior end of the valve are somewhat convex upward in their medial areas. These 3 postero-ventral ribs tend to project very slightly along the valve margin with the interspaces forming slight re-entrants between them. The surface of the valve above the most posterior of the 3 ribs is smooth, marked only by growth lines.

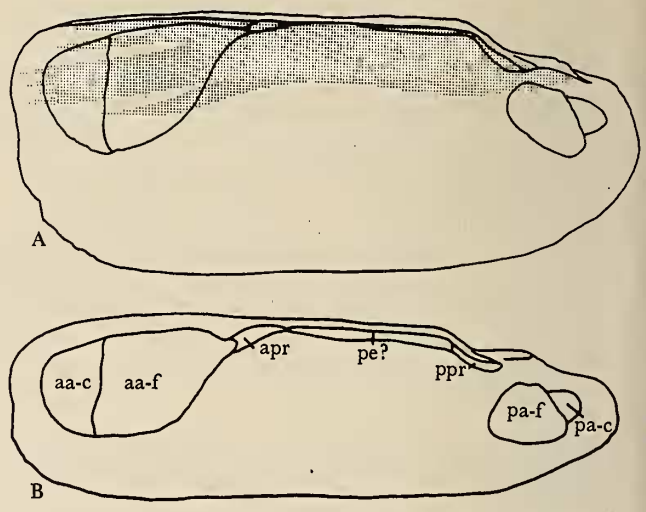

Figure 1

Solemya (Acharax) caribbaea H. E. Vokes, spec. nov.

A: Interior of right valve of holotype. B: Same, but valve tilted to show muscle scars that lie under the dorsal margin
aa-c anterior adductor muscle scar, "catch"segment
aa-f anterior adductor muscle scar, "fast" segment
pa-f and pa-c posterior adductor muscle scar, "fast" and "catch" segments, respectively
apr anterior pedal retractor muscle scar
ppr posterior pedal retractor muscle scar
pe? scar of pedal elevator muscle?
(approximately × 1)

Explanation of Plate 53

Solemya (Acharax) caribbaea H. E. Vokes, spec. nov.

Figure 1: Exterior of left valve covered by the ragged, dark brown periostracum

Figure 2: Exterior of left valve with periostracum removed (obliquely lighted to emphasize radial ornamentation)
Holotype USNM 679377

Lima (Acesta) colombiana H. E. Vokes, spec. nov.

Figure 3: Anterior view of conjoined valves
Figure 4: Exterior of right valve.
Holotype USNM 679378

(all figures × 1)

Figure 1

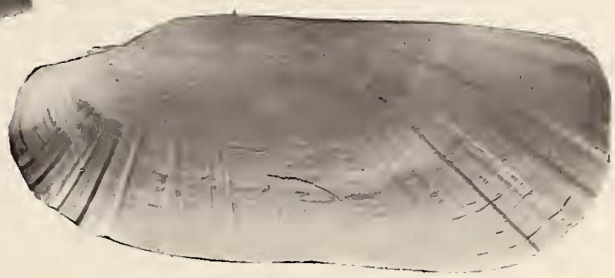

Figure 2

Figure 3

Figure 4

The paravincular ligament is opisthodetic, with the fibrous resilium seated on a relatively strong nymph plate that rises from the inner side of the thickened margin of the valve and curves upward so that its straight dorsal margin is essentially parallel with the anterior dorsal margin of the valve, though topographically a little lower than the latter. The resilium is attached to the outer surface of the nymph and arches over its dorsal side to its attachment in the other valve. The outer lamellar tensilium is longer than the resilium projecting posteriorly to it, thick and heavy, set in a distinct groove between the nymph plate and the raised posterior dorsal margin of the valve, and somewhat darker in color than the periostracum to which it is firmly cemented.

The interior of the valve is chalky white in color, with the interrib areas of the anterior and the posterio-ventral areas weakly reflected on its surface. The weak ribbing on the external median surface is evidenced only along the ventral margin where the deeper grooves margining the interspaces are represented by low rounded riblets. Anterior adductor scar relatively large, subquadrate in outline, not impressed; posterior adductor smaller, slightly impressed. Both scars show differentiation into 2 areas, a smaller outer and a larger inner one that probably reflect the areas occupied by the "quick" or "fast" muscle segment comprised of striated fibers and those with the "slow" or "catch" muscle segment comprised of smooth muscle fibers. Analogy with other bivalve species suggests that the smaller, outer portions of the scars were the seat of the "slow" muscle segments. A narrow, linear series of muscle attachment impressions follows the under side of the thickened dorsal margin extending posteriorly from a point immediately posterior to the anterior adductor scar to approximately the mid-length of the thickened nymph. Small areas set off from the others by a shallow groove, one at the anterior end of this series, the other at the posterior end located upon the edge of the nymph, are, by analogy with the illustrations of the anatomy of *Solemya "mediterranea* Lamarck" given by Deshayes (1845, plate 19, figure 5) attachment areas for the pedal retractor muscles, while the elongate, median scar probably marks the site of the pedal elevator muscle (Text figure 1 B). Pallial line not well delimited, but appears to have been entire, non-sinuated.

Holotype: U. S. N. M. no. 679377; length (with periostracum) 95 mm; (without periostracum) 78.3 mm; height (with periostracum) 47 mm, (without periostracum) 32.3 mm; diameter (paired valves) 22 mm.

Solemya (Acharax) caribbaea, spec. nov., differs from *S. (A.) grandis* Verrill & Bush (1898, p. 885; plt. 86, figs. 1, 2), the only other west Atlantic species of *Acharax,* described from material from 4 dredging localities off the eastern coast of the United States between Maryland and Massachusetts in depths of 300 to 1200 fathoms, in being a larger species, with more posteriorly situated umbones, and with fewer (4) radial ribs on the anterior end, as compared with 6 to 8 on *S. grandis.*

Solemya (Acharax) johnsoni Dall (1891, p. 189; 1895, p. 712; plt. 35, fig. 1) and its probable synonym (see Woodring, 1938, p. 27), *S. (A.) agassizii* (Dall, 1908, p. 365; plt. 16, fig. 10) have more numerous radial ribs both anteriorly and on the postero-ventral area, and umbones that are slightly more anteriorly situated than are those of the present species. Both are apparently larger species. There is, however, some uncertainty as to the dimensions of the type of *S. (A.) agassizii*; Dall gives the dimensions of the species in his description as: "Length ... excluding periostracum, about 95; height 30; and diameter, 25 mm. The species reaches a length of more than 150 mm." But his figured specimen (plate 16, figure 10), lacking periostracum, is said to be "lon. 145.0 mm." Woodring (1938, p. 27) states that "The type of *agassizi* is a large shell ... that has a length exclusive of the periostracum of about 143 millimeters." Accepting these larger figures, the type of *S. (A.) agassizii* is almost twice the size of *S. (A.) caribbaea.*

Limidae Rafinesque, 1815

Lima Bruguière, 1797

Type species, by subsequent tautonomy (Lamarck, 1801) *Ostrea lima* Linnaeus, 1758 = *Lima squamosa* Lamarck, 1801. Recent.

The writer has discussed in some detail the problems of the authorship and fixation of the type species in an earlier paper (Vokes, 1963).

(Acesta) H. & A. Adams, 1858

Type species, by M, *Lima "excavata* (Chemnitz)" = *Ostrea excavata* Fabricius. Recent, 150 to 1450 fathoms, Greenland to the Canary Islands.

A few years ago the writer described (Vokes, 1963, p. 77) under the name *Lima (Acesta) bullisi* a large species that had been trawled by the Fish and Wildlife Service M/V *Oregon* from localities 70 miles south-southeast, and 75 miles due south of the entrance to Mobile Bay, Alabama, at depths ranging from 300 to 600 fathoms. Subsequently he has seen, in the private collection of Mrs.